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Annual Southwestern Region Pest Conditions Report - 1982

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Annual Southwestern Region Pest Conditions Report 1982

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Foreword

This report on the forest insect and disease conditions and related activities in the Southwest in 1982 was compiled from information provided by the Forest Pest Management staff, Regional Office; Robert Celaya, Arizona Forestry Division; and Tony Smith, New Mexico Department of Agriculture.

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Insect and Disease Conditions

Conditions in Brief

Total acres of visible defoliation caused by western spruce budworm decreased from 477,960 in 1981 to 368,485 in 1982. The most extensive defoliation occurred on the Carson, Cibola, and Santa Fe National Forests, New Mexico; the Kaibab National Forest, and Grand Canyon National Park, Arizona; and private lands located in northern New Mexico. Egg mass density surveys indicated area and intensity of defoliation may increase slightly in 1983, especially in areas with new infestations, such as the Lincoln National Forest and Mescalero Apache Indian Reservation, New Mexico.

Pandora moth caused no defoliation in 1982 on the North Kaibab Ranger District, Kaibab National Forest, Arizona, due to its 2-year life cycle. Egg mass survey results indicated heavy defoliation will again occur in 1983 throughout much of the pine type on the North Kaibab Ranger District. However, virus rates appear to be building in the center of the infestation, where repeated defoliation has occurred and may indicate a collapse of the pandora moth population within these areas. To date, only minimal growth loss has resulted from this infestation.

Aspen defoliation caused by western tent caterpillar and large aspen tortrix decreased from 39,075 acres in 1981 to 23,620 acres in 1982. Most of the defoliation occurred on the Carson and Santa Fe National Forests, and the Santa Clara Pueblo and Taos Pueblo Indian Reservations in New Mexico.

Most bark beetle-caused mortality generally decreased in the pine and mixed conifer types in the Southwest in 1982, with mountain pine beetle, western pine beetle, Ips beetles, Douglas-fir beetle, fir engraver beetle, and western balsam bark beetle causing mortality in small groups at widely scattered locations. However, spruce beetle activity increased dramatically on the Fort Apache Indian Reservation, Arizona, and Santa Fe National Forest, New Mexico, where mortality was detected over 14,000, and 4,600 acres, respectively. Based on ground surveys conducted on over 23,000 acres of the Fort Apache Indian Reservation, it was determined that approximately 100 million board feet of merchantable spruce have been killed by, or were currently infested with, spruce beetle. Beetle population and subsequent tree mortality are expected to continue to increase.

Southwestern dwarf mistletoe continued to have a major impact on growth and yield of ponderosa pine in the Southwest. Over 24,000 acres of ponderosa pine were surveyed. The resultant data were used in the RMYLD

simulated yield program to assist in developing management alternatives for infected stands.

Status of Major Insect Pests

Western spruce budworm, Choristoneura occidentalis Free. Total acres of visible defoliation (figure 1) caused by this insect decreased from 477,960 in 1981 to 368,485 in 1982. Areas with the most extensive defoliation included the Carson National Forest (103,475 acres), Santa Fe National Forest (172,315 acres), and the Cibola National Forest (17,875 acres) in New Mexico, and the Kaibab National Forest (23,650 acres) and Grand Canyon National Park (7,800 acres) in Arizona. Areas with less extensive defoliation were observed on the Gila National Forest (5,975 acres) and the Lincoln National Forest (4,100 acres), as well as on other Federal and nonindustrial private ownerships, totaling 17,015 and 16,280 acres, respectively, throughout the Region. These data are summarized in table 1. Data from egg mass density surveys conducted throughout many of the infested areas indicated area and intensity of defoliation caused by western spruce budworm may increase in 1983.

Sampling was conducted for the Western Spruce Budworm Suppression and Evaluation Project in the Jemez Mountains, Santa Fe National Forest, for the sixth consecutive year. Budworm populations, acres defoliated, and intensity of defoliation increased in both treated and untreated areas. While the treated area continued to have considerably lower population levels and less defoliation than the untreated area, egg mass densities in the treated area doubled from 1981 to 1982, which could lead to moderate and heavy defoliation in 1983.

Table 1. Status of western spruce budworm infestations, Southwestern Region, 1982

Class	Outbreak area (acres)			
	L	M	H	Total
National Forest	136,580	126,055	64,755	327,390
Other Federal[1]	175	10,170	160	10,505
Indian reservations	6,010	5,725	2,575	14,310
Nonindustrial, private	7,575	6,105	2,600	16,280

L = light; M = moderate; H = heavy

1 Includes lands administered by the National Park Service, Bureau of Land Management, and Department of Defense.

Pandora moth, Coloradia pandora Blake. Because of its 2-year life cycle, pandora moth caused no defoliation on the North Kaibab Ranger District, Kaibab National Forest, in 1982. Results of an egg mass survey, combined with the overall low prevalence of naturally occurring virus, indicated heavy defoliation will again occur in 1983 throughout much of the ponderosa pine type on the North Kaibab Ranger District. However, virus rates appear to be building in the center of the infestation, where repeated defoliation has occurred, and may indicate a collapse of the pandora moth population within these areas. Pandora moth adults were observed at various other locations throughout the Region including Prescott, Pinetop, Payson, and Crown King, Arizona, but no significant defoliation has been detected in these areas.

A survey to assess losses caused by this insect was conducted throughout the Jacob Lake infestation (North Kaibab Ranger District) in early October 1982. Preliminary results indicate only minimal growth loss has occurred thus far. Radial growth was reduced by 25 percent over the last 4 years in trees repeatedly defoliated by pandora moth, particularly in trees heavily infected with dwarf mistletoe. Very few bark beetle-infested trees were found and no significant bark beetle outbreak is expected in the near future.

Forest Pest Management personnel assisted John Schmid, Rocky Mountain Forest and Range Experiment Station, in conducting a field test of four insecticides against early instar pandora moth larvae near Jacob Lake, Arizona. Chemicals tested were acephate, carbaryl, dimilin, and malathion. Acephate applications yielded the highest mortality rates.

Aspen defoliators. Acres of visibly defoliated aspen decreased from 39,075 in 1981 to 23,620 in 1982. Heaviest defoliation occurred on the Carson and Santa Fe National Forests, with 7,400 and 9,170 acres, respectively. Other areas of substantial defoliation were detected on the Santa Clara Pueblo and Taos Pueblo Indian Reservations, New Mexico. Most aspen defoliation was probably caused by western tent caterpillar, Malacosoma californicum Pack., particularly on the Santa Fe National Forest and Santa Clara Pueblo Indian Reservation. Limited ground surveys showed aspen defoliation near Garcia Park, Carson National Forest, was caused by large aspen tortrix, Choristoneura conflictana (Walker). Field surveillance reports indicated a few aspen stands on the Kaibab National Forest, Arizona, also were defoliated by large aspen tortrix.

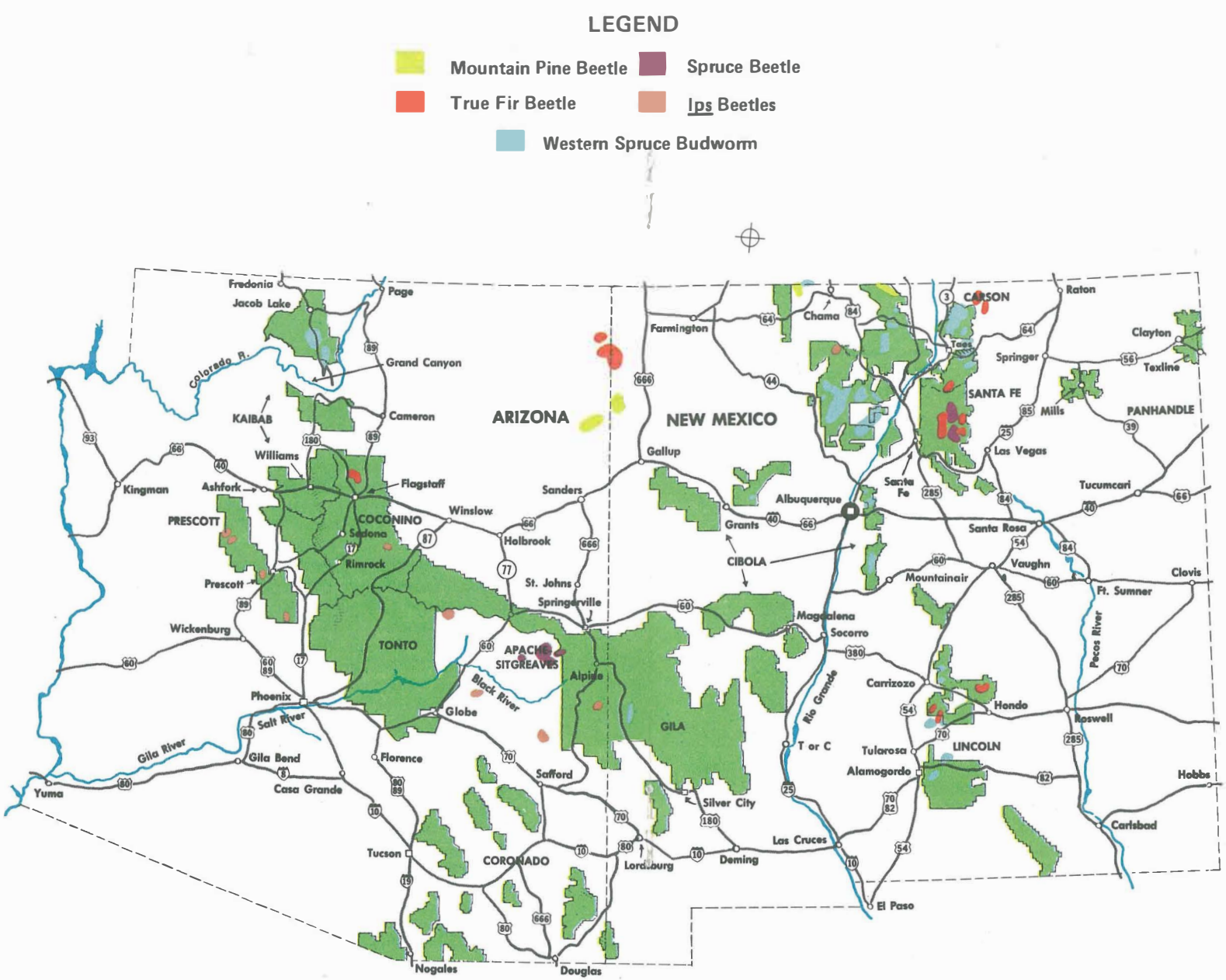

Figure 1. Location of major insect infestations occurring in 1982, Southwestern Region

Spruce beetle, Dendroctonus rufipennis (Kirby). Spruce beetle-caused mortality increased dramatically, with major infestations occurring over 4,600 acres on the Pecos Ranger District, Santa Fe National Forest; and 14,000 acres on the Fort Apache Indian Reservation, where approximately 4 million board feet of timber have been salvage logged in the past year. Spruce beetle mortality was also detected on 150 acres of private land on Redondo Peak, New Mexico.

Forest Pest Management personnel assisted personnel from Fort Apache Indian Reservation in conducting an extensive survey throughout the current spruce beetle infestation. They determined that approximately one-fifth, or 100 million board feet, of the merchantable spruce in the 23,000-acre survey area was dead or currently infested, and an increase in the beetle population was predicted for 1983. Salvage and presalvage logging to utilize as much of the standing dead and susceptible green trees as possible was recommended.

Other areas of significant spruce mortality were detected on the Questa and Penasco Ranger Districts and the Valle Vidal Unit, Carson National Forest; and the Cuba, Las Vegas, and Espanola Ranger Districts, Santa Fe National Forest, New Mexico (figure 1).

Mountain pine beetle, Dendroctonus ponderosae Hopk. The mountain pine beetle continued to cause mortality in ponderosa pine at widely scattered locations on the northern forests of Arizona and New Mexico (figure 1). Areas of concentrated mortality, where salvage logging may be considered, occurred on: Tres Piedras Ranger District, Carson National Forest; North Kaibab Ranger District, Kaibab National Forest; and on the northern portion of the Jicarilla Apache Indian Reservation. Elsewhere, mortality levels were lower than last year and generally resulted in only small scattered groups of dead trees.

Ips engraver beetles, Ips spp. Ponderosa pine mortality due to Ips engraver beetles was at a lower level than that of the past 3 years, with only minor, isolated pockets observed in most of the ponderosa pine type. A few areas of concentrated mortality were detected on: Clifton Ranger District, Apache-Sitgreaves National Forests; Long Valley and Blue Ridge Ranger Districts, Coconino National Forest; Bradshaw Ranger District, Prescott National Forest; and the San Carlos Apache Indian Reservation (figure 1).

The slash in several precommercially thinned pine stands on the Chalender and Williams Ranger Districts, Kaibab National Forest, was heavily infested with Ips beetles. A total of 250 acres of Ips-infested slash were chipped to control the infestation.

Status of Other Insects

Common name	Scientific name	Host	Locality	Remarks
Balsam twig aphid	Mindarus abientinus Koch	White fir	Bill Williams Mountain, Kaibab NF, Arizona	Causing deformation and discoloration of new needles on most size classes of white fir
Pine butterfly	Neophasia menapia (Felder and Felder)	Ponderosa pine	Springerville RD, Apache-Sitgreaves NF's, Arizona.	No visible defoliation
Pinyon needle scale	Matsucoccus acalyptus Herbert	Pinyon pine	Wupatki National Monument, Hualapai Mountains, Seligman, and Prescott, Arizona; and Mountainair RD, Cibola NF, New Mexico	Scattered
Sawflies	Neodiprion spp.	Pinyon pine	Wupatki National Monument and Cibola and Santa Fe NF's, New Mexico; and Prescott NF, Arizona.	Scattered
Tiger moths	Halisidota ingens Hy. Edwards	Ponderosa pine and pinyon pine	North Kaibab RD, Kaibab NF, Arizona	Light population in pinyon pine
Pine needle sheathminer	Zelleria haimbachi Busck.	Ponderosa pine	Flagstaff, Arizona.	Tip damage to individual trees on about 600 acres.
Douglas-fir tussock moth	Orgyia pseudotsugata McDunnough	White fir, Douglas-fir, and spruce	Raton, New Mexico	Heavy defoliation on ornamental conifers. Treatment by State, municipal, and private owners is planned for 1983.

Status of Endemic Pest Complexes

Low-level growth loss and widely scattered tree mortality due to one or a combination of endemic pests occur annually throughout the coniferous forests of the Southwest. Such losses often occur in overmature trees or in trees predisposed to bark beetle attack or disease infection by drought, stand stagnation, fires, root diseases, dwarf mistletoe infections, or poor growing site conditions. These losses are usually accepted and warrant no concern.

Douglas-fir mortality. A few small, isolated groups of Douglas-fir mortality were detected on the Carson, Coconino, Kaibab, and Santa Fe National Forests, and the Taos Pueblo and Navajo Indian Reservations. This mortality was probably due to a complex of Douglas-fir beetle, Dendroctonus pseudotsugae, Hopk., root diseases, and Douglas-fir dwarf mistletoe infections. In some areas, continuous heavy defoliation by western spruce budworm may have predisposed trees to Douglas-fir beetle attack. No significant losses are expected next year.

True fir mortality. Several groups of true fir mortality were observed throughout much of the mixed conifer and spruce-fir types of the Region (figure 1). Although, the exact cause of mortality is not known in all areas, ground checking at selected locations suggested a complex of root diseases; fir engraver beetle, Scolytus ventralis LeC. (in white fir); and western balsam bark beetle, Dryocetes confusus Swaine (in subalpine fir), may have caused mortality.

Ponderosa pine mortality. Widely scattered mortality, singly or in groups of 2 to 10 trees, was detected throughout much of the ponderosa pine type in the Southwestern Region. Most of this mortality was probably due to western pine beetle, Dendroctonus brevicomis LeC., or red turpentine beetle, Dendroctonus valens LeC. Trees attacked by these bark beetles were mainly mature or overmature and weakened by lightning strikes, fires, diseases, or other factors. Similar low-level mortality has occurred for the past several years and is generally too scattered to justify salvaging.

Status of Diseases

Dwarf mistletoe, Arceuthobium spp. Southwestern dwarf mistletoe, A. vaginatum subsp. cryptopodum (Engelm.) Hawks. & Wiens, continued to have a major impact on growth and yield of ponderosa pine in the Southwestern Region.

Surveys were conducted on 24,015 acres of infected ponderosa pine stands on five Ranger Districts. The data were used to run the RMYLD simulated yield program to assist in developing management alternatives for infected stands.

Sycamore anthracnose, Gnomonia platani Kleb. Extensive defoliation and branch dieback occurred in the Sedona-Oak Creek Canyon area and at other scattered locations in northern Arizona. Ideal weather conditions for the spread of this disease have existed for the past 2 years. Since repeated defoliation by this disease can cause tree mortality, efforts to publicize its presence, as well as recommendations to treat individual trees, will be initiated next spring by the State of Arizona.

Root diseases. Preliminary results of a root disease incidence survey conducted on 2.8 million acres of the Apache-Sitgreaves, Coconino, and Kaibab National Forests, Arizona; and Carson and Santa Fe National Forests, New Mexico; indicated that root diseases contributed to the death of trees containing approximately 9.9 million board feet of timber during the survey year 1981. Number of trees and volumes per acre killed by root diseases, mainly caused by Armillariella mellea, were higher in the mixed conifer and spruce-fir types than in the pine type.

Nursery diseases. Pre- and post-fumigation population surveys of soil-borne pathogen levels at the Albuquerque Tree Nursery were conducted in the spring of 1982. Spring fumigation was effective in reducing levels of Fusarium spp.

Forest Pest Management Activities in 1982

Major activites of the Southwestern Region Forest Pest Management (FPM) staff include detection, evaluation, and suppression of forest pests and technical assistance to forest land managers on all Federal lands in Arizona and New Mexico. In addition, FPM personnel cooperated with the States of Arizona and New Mexico in carrying out forest pest management activities on State and private lands through the Cooperative Forest Pest Action Program.

Detection Surveys

Detecting and monitoring insect and disease outbreaks and infestations is a major responsibility of the FPM staff. This is accomplished by systematic low-level aerial surveys, ground examinations, and encouraging forest workers to report unusual and suspected insect and disease occurrences by means of field surveillance kits provided by FPM.

Aerial surveys were conducted from July through September over 10.5 million acres of coniferous forests in Arizona and New Mexico to determine the location and extent of damage caused by insects and/or diseases. Upon completion of the surveys, maps showing the location, relative intensity, and kinds of outbreaks were prepared and sent to the respective administrative units. Table 2 lists acres surveyed by State and administrative unit.

Ground examinations were made, when necessary, to confirm aerial detection observations, as well as in response to requests from land managers for detailed information or identification. State pest management specialists conducted ground surveys on State and private lands in Arizona and New Mexico.

A wide variety of insects and diseases were identified by the staff from surveillance reports sent by forest workers from across the Region. Such reports are important for the early detection of potential pest problems, and land managers and forest workers are encouraged to continue to be alert for, and prompt in, reporting any unusual insect or disease activity.

Table 2. Acres aerially surveyed in the Southwestern Region in 1982

Administrative unit	Acres	Administrative unit	Acres
Arizona		New Mexico	
Apache-Sitgreaves NF's	1,329,600	Carson NF	826,300
Coconino NF	929,700	Cibola NF	492,500
Coronado NF	168,600	Gila NF	1,144,200
Kaibab NF	695,700	Lincoln NF	396,400
Prescott NF	44,600	Santa Fe NF	936,300
Tonto NF	90,100	Isleta Pueblo IR	8,200
Fort Apache IR	1,061,165	Jemez Pueblo IR	13,385
Navajo IR	373,500	Jicarilla Apache IR	162,260
San Carlos Apache IR	120,000	Navajo IR	124,500
Grand Canyon NP	163,800	Mescalero Apache IR	172,200
		Taos Pueblo IR	42,840
		Santa Clara Pueblo IR	14,600
		Bandelier NM	20,670
		State and private	1,242,700[1]
	TOTAL	10,573,820	

[1] Surveyed by Tony Smith, New Mexico Department of Agriculture.

Evaluations

Another major responsibility of FPM is to evaluate forest pest problems and provide land managers with alternatives and recommendations for management through a variety of approaches. Sixteen evaluations were conducted in 1982.

Entomology: The following new and continuing insect evaluations were conducted: (1) An evaluation to assess the extent and severity of a spruce beetle infestation in the White Mountains, Fort Apache Indian Reservation, Arizona; (2) an evaluation of Ips-infested slash and adjacent stands on the Kaibab National Forest, Arizona; (3) a pandora moth infestation survey to assess loss and to predict 1983 defoliation based on egg mass densities and the prevalence of naturally occurring virus, Kaibab National Forest, Arizona; (4) second-year monitoring to determine the effects of treatment following a cooperative pilot project with the State of New Mexico in which Bacillius thuringlensis (B.t.) was aerially applied to a low-level population of western spruce budworm, Moreno Valley, New Mexico; (5) western spruce budworm egg mass density surveys to monitor population trends and predict 1983 defoliation on the Carson, Cibola, Lincoln, and Santa Fe National Forests, and on other Federal and private lands in New Mexico; (6) stand examinations to determine posttreatment stand conditions following western spruce budworm defoliation and monitor population densities and defoliation levels on five silvicultural demonstration units, Carson National Forest, New Mexico; (7) sixth-year western spruce budworm population monitoring of a

sion project designed to determine the long-term effects of treatment with a carbaryl spray, Santa Fe National Forest, New Mexico; and (8) fifth-year loss assessment survey to determine losses from western spruce budworm in relation to the population dynamics of the insect, Carson National Forest, New Mexico.

Pathology: Disease evaluations included: (1) Dwarf mistletoe control postsuppression surveys on the Kaibab and Prescott National Forests, Arizona, and the Lincoln National Forest, New Mexico; these surveys covered a total of 2,134 acres; (2) dwarf mistletoe biological evaluations on the Apache-Sitgreaves and Kaibab National Forests, Arizona, and the Carson and Santa Fe National Forests, New Mexico; these surveys totaled 5,790 acres; (3) salt damage determination on 12 acres, Bandelier National Monument, New Mexico; (4) hazard tree rating on 10 acres of cottonwoods at Indian Gardens and Phantom Ranch, Grand Canyon National Cultural Park, Arizona; (6) an examination of diseased oaks (200 acres), Kaibab National Forest, Arizona; (7) a survey of 500 acres for root disease caused by Armillariella mellea on the Jemez Ranger District, Santa Fe National Forest, New Mexico; and (8) a biological evaluation of declining Rio Grande cottonwoods subjected to flood plain aggradation (10,240 acres), Chaco Culture National Historical Park, New Mexico.

Suppression Projects

Occasionally, certain forest pests cause unacceptable damage to forest resources and must be managed by employing a combination of silvicultural, mechanical, biological, or chemical suppression strategies.

In the past year, FPM specialists conducted or participated in the following suppression projects: (1) Aerial application of carbaryl and B.t. to suppress western spruce budworm on 32,594 acres of private land and 35,753 acres of the Carson National Forest, New Mexico; (2) chipping of infested slash to suppress Ips beetle, Kaibab National Forest, Arizona; (3) aerial application of four different insecticides to field test their effectiveness against early instar pandora moth larvae (in cooperation with Rocky Mountain Forest and Range Experiment Station), Kaibab National Forest, Arizona; and (4) thinning, pruning, chipping, and removing to control dwarf mistletoe infestations on the Apache-Sitgreaves (382 acres), Kaibab (505 acres), and Tonto (80 acres) National Forests, Arizona, and the Carson (533 acres) and Santa Fe (1,815 acres) National Forests, New Mexico.

Recent Publications

Beatty, Jerome S. 1982. Integrated pest management guide, southwestern dwarf mistletoe, Arceuthobium vaginatum subsp. cryptopodum (Engelm.) Gill, in ponderosa pine. R-3 82-13. 12 pp.

Bennett, Dayle D., and Iral R. Ragenovich. 1982. A pilot control project to evaluate acephate for control of pandora moth, Coloradia pandora Blake (Lepidoptera: Saturniidae), Jacob Lake, Ariz., 1981. R-3 82-10. 36 pp.

Linnane, James P. 1982. Biological evaluation, western spruce budworm, Lincoln NF, N. Mex. R-3 83-1. 11 pp.

Ragenovich, Iral R. 1982. Biological evaluation, spruce beetle, Fort Apache Indian Reservation, Ariz. R-3 82-6. 22 pp.

Rogers, Terrence J., and N. William Wulf. 1982. Western spruce budworm silvicultural demonstration area project, Carson NF, N. Mex. Rep. No. 2. R-3 82-8. 13 pp.

Rogers, Terrence J. 1982. Biological evaluation, western spruce budworm, Carson NF, N. Mex. R-3 83-2. 19 pp.

Stein, Catherine R., and George R. McDonnell. 1982. Western spruce budworm damage assessment project, 1981, Carson NF, N. Mex., Prog. Rep. No. 4. R-3 82-12. 40 pp.

Telfer, William G., Iral R. Ragenovich, and Terrence J. Rogers. 1982. Western spruce budworm suppression and evaluation project using carbaryl-1977, Santa Fe NF and Jemez Pueblo Indian Reservation, N. Mex. R-3 82-7. 18 pp.

Telfer, William G. 1982. Biological evaluation, western spruce budworm, Santa Fe NF, Jemez Indian Pueblo, and Santa Clara Indian Pueblo, N. Mex. R-3 83-3. 22 pp.

Wood, Robert E. 1982. Biological evaluation, root disease and southwestern dwarf mistletoe, comp. 317.1, Jemez RD, Santa Fe, N. Mex. R-3 82-9. 7 pp.

Wood, Robert E. 1982. Biological evaluation, damage to trees II, Chaco Canyon National Cultural Park, Bloomfield, N. Mex. R-3 82-11. 2 pp.

Wood, Robert E., and Phillip M. Wargo. 1982. Biological evaluation, rate of decline of Rio Grande cottonwoods subjected to flood plain aggradation and other environmental stresses. R-3 83-4. 6 pp.

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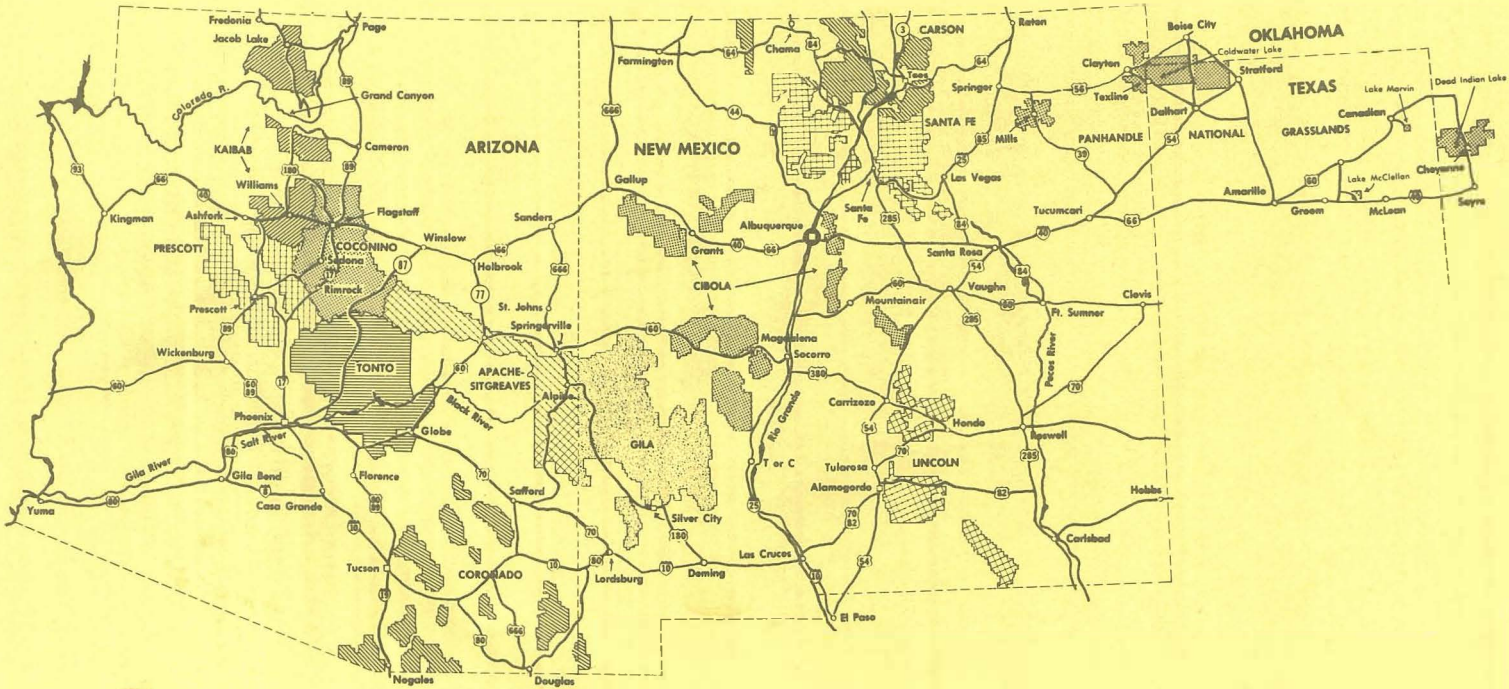

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